MINISTER'S OPTIMISTIC ECONOMIC REPORT COUNTERED

Athens MESIMVRINI in Greek 12 Nov 84 p 8

/Article by K. Kolmer/

/Excerpt/ - The real GNP will increase by 2 to 2.5 percent this year.

- Agricultural production will increase by 6 to 7 percent, industrial production by 1.5 percent and services by 2 percent.

- This year, inflation will fluctuate around 18-18.5 percent and the public deficit will reach 10.3 percent of the GNP.

- The widening of the balance of payments will not surpass 1.9 billion dollars in 1984.

In short, devout wishes.

The method used by Mr Arsenis in his self-deception is simple: He revised the level of public consumption by 1 percent (compared to the July 1984 forecasts), he increased gross investments by 1.1 percent (compared to February 1984 and a real drop this year) and he anticipated that the foreign balance of goods and services would show a deficit of only 22.2 billion drachmas (1.8 billion dollars) compared to 35.5 billion drachmas that he anticipated at the beginning of the year and 2.2 billion dollars (27.5 billion drachmas) that is anticipated by the end of the year.

Thus, Mr Arsenis managed "with a thousand coersions" to show a rise in the GNP, in expenditures of firm 1970 purchase prices, by 2.2 percent compared to 0.4 percent last year and 0 the year before that. But evidently with the increase of public expenditures, with a decrease in investments and with the downgrading of the real size of the foreign deficit, there cannot be any increase in the GNP. Unless one makes use of the algebra of the Karagiozis /marionette/.

Now, let us see how this increase in the GNP, according to Mr Arsenis, has come about. In 1984, agricultural production increased by 16 percent while stockraising dropped by about 1 percent, industrial production will increase by 1.5-2 percent by the end of the year, while construction will drop by 4 percent and services will increase by 2 percent.

But even if we were to assume that this agricultural product increased by 7 percent in 1984 --that does not appear to us to be exact if we take into consideration the fact that at this time we are making large-scale imports of wheat and also the fact that sugar production is lower this year-- again Mr Arsenis' figures do not appear realistic. This is so because of the following:

- Industrial production, from August on, appears to have decreased. Building construction dropped by 26 percent throughout Greece (August data), while the increase of electric power production by 5 percent is reckoned together with imports from Albania, Yugoslavia and Bulgaria. As for the rise in ore production, there are some doubts being raised because both bauxite and fired magnesium production dropped this year.

- As for the services product, if one were to omit the increase in tourism, it is artificially blown up through the tactic of expanding their portion in the GNP from 53 percent in 1981 to 55 percent in 1984, compared to just 49 percent in 1974. Unless the large-scale hirings by the state are considered to create a product.

Finally, but not definitively, by revising last year's GNP figures from 418.3 billion to 417.5 billion this year, Mr Arsenis won another one-third of a point of overall increase.

What do we want with figures anyway if it is evident that the Greek economy is going from bad to worse, when this year the size of investments, for the third straight year in a row, will decrease and be at a level lower than they were in 1975! This says everything: Socialist Greece is living beyond its means with loans --but not unpaid-- and as Mr St. Manos said the day before yesterday, "to the detriment of the revenues of future generations."

5671
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ND OFFICIAL: FOREIGN DEBT LEADS TO BANKRUPTCY

Athens I KATHIMERINI in Greek 24 Nov 84 p 7

/Text/ In an interpellation in the Chamber of Deputies, Mr Miltiadis Evert, deputy from Athens, said the following after the Minister of Finance refused to produce documents relative to the budget:

The government does not respect the Chamber of Deputies. It systematically refuses to produce data that we have repeatedly asked for. At the same time, through means of amazing alchemy, it is attempting to mislead the people with false data. Already, the Statistical Service is raising the number of unemployed to 360,000 while the unemployment increase trend is evident from OAED /Labor Force Employment Organization/ statistics for the month of October. Thus, in October 1981 the figure was 26,000, in October 1983 it was 48,000 and in October 1984 it was 61,000.

We are being led toward bankruptcy. The public debt that was 671 billion drachmas in 1981 will rise to 1.9 billion in 1984, i.e. an 183 percent jump. Foreign borrowing increased by 98 percent. During the 9-month period of 1981 it amounted to 857 million dollars. During the corresponding period of 1984 it was 1.484 million dollars. The ratio of foreign borrowing to the gross domestic product was 25 percent.

Other statistics that prove the economic calamity is the drop in economic activity by 18 percent.

Industrial production is at a level lower than in 1981.

Overdrafts have increased sixfold.

The eight biggest problem companies, that had suffered 4.5 billion drachmas in losses in 1981, suffered 14 billion drachmas in losses at the end of 1983. Their overall liabilities rose from 64 billion in 1981 to 104 billion at the end of 1983.

Their investments, in firm prices, dropped from 82 billion drachmas in 1981 to 77 billion in 1984.

The deficit of the regular 1984 budget will surpass 240 billion drachmas; the petroleum products account 40 billion; public organizations 180 billion; and public investments 200 billion. In other words, the overall deficit will amount to 660 billion drachmas.

5671
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ELECTRONICS INDUSTRY EXPERIENCING STRONG GROWTH

Oslo AFTENPOSTEN in Norwegian 12 Nov 84 p 31

[Article by Ulf Peter Hellstrom: "A New Research Report Shows: The Electronics Industry Is Experiencing Growth"]

[Text] Since the mid-seventies the Norwegian electronics industry has experienced a rise in gross production value and processing value of about 10 percent in constant kroner, while Norwegian industry has been experiencing zero growth for a number of years now.

Electronics for business (and certainly the data processing companies) have shown a dramatic level of growth, while the telecommunications industry has stagnated, and Norwegian production of consumer electronics has collapsed in the wake of the Tandberg failure.

These are two of the major conclusions of the recent prospects analysis entitled "The Norwegian Electronics Industry--Status and Prospects," which the Report Center of the Institute for Business Economics carried out at the request of the Branch Association of the Electronics Industry (EBF). The analysis was performed by researchers outside of the electronics branch who attempted to take a critical look at the branch. The information in the report comes from the industrial statistics of the Central Office of Statistics, as well as a special survey which the Office carried out on the production, export and import of electronics products. In addition, the analysis is based on data about the large, heavy Norwegian production companies which form the backbone of the membership in the EBF.

This limits the generality of the report to a certain extent because the electronics field in Norway also comprises a number of small Norwegian companies as well as the data processing subsidiaries of the large multinationals in Norway, such as IBM Norge [Norway]. The newest part of the report dates from 1982, so that the recent changes in the electronics market, to say nothing of the stock market, are not included to a great extent.

In general, the electronics industry in Norway includes the following three main groups: data processing companies, telecommunications companies and producers of consumer electronics. In reality, software houses of

various types are not included. Among the largest data processing companies which are covered by the report are Norsk Data [Norwegian Data Co] and Tandberg Data through Siemens Norge, while the Elektrisk Bureau [Electric Bureau] and Standard Telefon og Kabelfabrik [Standard Telephone and Cable Factory] predominate among the telecommunications companies. Tandberg Industrier [Industries] A/S [Inc] accounts for, among other things, consumer electronics. The Simrad companies and Kongsberg Vapenfabrikk [Weapons Factory] are also included in the report.

[Figure caption: Electronics for Business (Figure) Are Doing Well Among the Norwegian Electronics Companies, But Consumer Electronics Have Suffered a Decline Since the Failure of Tandberg, Indicates the Prospects Analysis.]

Production

The gross production value of the electronics industry rose by 9.7 percent in the period between 1975 and 1982, in constant kroner. The researchers term this growth rate moderate, but point out at the same time that Norwegian industry [overall] experienced almost zero growth during the same period. The electronics firms' processing value rose by 10.7 percent during this period, so that this value represented 43 percent of the production value in 1982. By comparison, the corresponding figures for Norwegian industry were 27 percent and 35 percent for the engineering industry in 1981.

In both 1975 and 1982 the electronics branch employed just short of 13,000 people. During the same period employment in industry as a whole dropped. In 1981 the investments in capital equipment as a proportion of sales amounted to 5.6 percent, which is somewhat above-average for the engineering industry. R&D are not included in this figure.

Not unexpectedly, the report shows that the small electronics firms have decidedly the fastest growth rates in employment and sales. This is of importance for evaluating the electronics industry overall in this country because most of the firms which are not in the EBF and which therefore are not covered by the study in this regard are smaller firms.

Exports

The special survey done by the Central Office of Statistics shows that during the period 1978-1982 the Norwegian electronics industry experienced significant growth in its exports. The Office's data show an increase of 42 percent, measured in constant kroner, during this period. Here the data processing branch showed a growth rate of 71 percent between 1978 and 1980, but the group excluding business electronics increased a full 95 percent. The exports of the telecommunications industry rose by 37 percent.

It should be noted that, while in 1982 the telecommunications industry was still ahead of the data processing industry in sales, the picture is the opposite as regards exports: here the exports of data processing

equipment are nearly half again as large as those of telecommunications equipment. The researchers estimate the share of exports at 60-70 percent for the data processing industry, while the share in the telecommunications industry is down around 20-30 percent.

This reflects a situation which is probably the same today: while the Norwegian telecommunications industry is dominated by EB and STK, both of which are largely oriented toward the Norwegian domestic market, the data processing industry has concentrated to a great extent on the international market, which is often the only place where the data processing firms can grow. The electronics industry as a whole had an export level of 41 percent in 1982.

The North Sea

The prospects analysis notes that Norwegian electronics firms have built up a solid competitive position in the off-shore market. The trend is toward a steady increase in the use of electronics in connection with off-shore oil production.

It is impossible to ascertain how large the domestic market will be in the coming years. As a point of reference, however, the report states that 220 million kroner worth of electronics are being purchased for Gullfaus' A platform. This includes purely electronic systems such as control and monitoring equipment, telecommunications gear, etc., as well as instrumentation and electronics which go into mechanical equipment. Installation is not included in this figure. The researchers estimate the total value of equipment deliveries to Gullfaus at about 1.4 billion kroner. Sixty percent of the electronics deliveries are coming from Norwegian companies, and this figure is corrected for direct imports to the Norwegian firms.

Gullfaus' A Project had previously been singled out as a pioneer in the use of data processing technology off-shore. The platforms which are later to be built and used in fields such as Troll, Oseberg, Sleipner and Haltenbanken will probably use the new technologies to at least as large an extent.

The oil rate [as published] committee indicates that the total market for investments in the Norwegian shelf will be about 15 billion 1982 kroner per year up till the year 2000, provided that production gradually rises toward 90 million petroleum equivalent tons in 2010. If Gullfaus A is taken as an indication of the [market] share of electronics for the future, we can expect a total investment market of 200-300 million kroner per year, not including installation, predicts the prospects analysis.

Public Indifference

A great deal of space is devoted to the role of the public in the prospects analysis of the electronics industry. The report points out, among other things, that concern over inflation and limits on public expenditures

have had the effect that the political goals of real growth in appropriations for technical and industrial research and development have lagged far behind previous levels. On this and a number of other points, the report contains critical comments regarding the role of the authorities. Among other things, the report proposes that the authorities should work to assist the Norwegian electronics industry by making government purchases of equipment to a much greater extent than heretofore.

The prospects analysis was written before, however, the Government presented its proposed government budget in which a growth package for industry was proposed and where information technology was mentioned as one of the four areas which the authorities want to emphasize in particular in the coming years.

The prospects analysis also calls for complete digitization of the telecommunications system before 1995 and rapid expansion of the remote data processing network, as well as a freer hand for the Televerk [Telecommunications Office] in a market characterized by growing competition. The Televerk's own [growth] rate plan calls (by comparison for having 55 percent of the telephone customers be hooked up to digital exchanges before 1992.

Integrated circuits are in the process of replacing the oil barrel as a symbol of power, and there is heavy competition in technology and industrial policy in the most developed countries to lay the groundwork for new industries, say the researchers, who claim that Norway must, as a nation, take stronger measures starting immediately to ensure that the country continues to develop an electronics industry which is capable of competing on the international market.

Foreign Assessment:

Norsk Data Up

Financial analysts abroad have adjusted upward their forecasts of the before-taxes results [profits] of Norsk Data [Norwegian Data Co] for this year from about 200 million to an estimated 220-230 million kroner. This was revealed by administrative director Rolf Skar at the company offices during the general stockholders' meeting on Saturday. In general, the estimates of sales are on the order of 1.3-1.4 billion kroner, and the forecasts for next year range around 1.8-1.9 billion.

Due to stock exchange regulations both at home and abroad, the head of Norsk Data was not at liberty to state how the data company was faring at the end of the fiscal year; he could only cite the figures with which market observers in New York and other cities are working. These estimates have often been accurate in the past.

Next year Norsk Data is expecting to have a surplus before taxes [gross profit] of approximately 325-350 million kroner, according to many analysts. Approximately 15 percent of the earnings is paid in taxes.

The estimates of per-share earnings for the current year are about 20 kroner, or just below that. Over the last few days the stock exchange rates [prices] have exceeded earnings by a factor of some 18-19.

CSO: 3639/41

YOUTH LOSING FIGHT FOR NEW JOBS IN ECONOMY

Stockholm DAGENS NYHETER in Swedish 1 Nov 84 p 16

[Article by Soren Lofvenhaft: "20-Year-Study of 250 Jobs--Youth Is Losing Fight For New Jobs"]

> [Text] Changes in the labor market have affected young people the most. They have lost a considerable share especially in expanding sectors--despite their higher educational training.
>
> This was recently shown by a study of the trends of 250 professional groups over a period of 20 years, which was prepared by Orebro university.

Furthermore, young people tend to concentrate on getting jobs in the sector with unqualified jobs which do not require any training.

This is also where the threat looms largest for them to become unemployed.

"This is a sign of the future we must prevent if unemployment for young people is to be solved," says Rolf Stal, Ph.D.

He and sociologist Olle Bursell together examined how young people, between 16-24 years of age, managed to get by in the increasingly more difficult competition on the open labor market since 1960 until the 1980's.

"It is very clear that the regular labor market--more and more--has cut off young people from jobs. It has become harder and harder for them to gain access to it," says Stal.

Lost Ground

The two researchers established that:

- Young people consistently lost ground in the five sectors of the labor market that expanded during this period of time (see diagram). The only

- exception they found was in the service sector where the 20-24 year-old group increased its share--but this did not apply to younger boys or girls.

- The youngest group--16-19 year-old--show a downward curve in their share of the three declining fields--as well as the unchanged part time labor market. The older group (20-24-years old) have gotten along better in this category but their future prospects are uncertain.

Rolf Stal comments: "If the future means to be in on where there is expansion and not where there is a trend toward recession, then young people will have a rough time in the future on the labor market."

"The really big losers on the open labor market are the young people between 16-19 years of age," he says.

Reduction

In 1960 there were about 300,000 young people in that age-bracket who were gainfully employed. By 1980 that number had been dramatically reduced by more than a half.

"This large exit of youth from the labor market cannot be explained by the fact that they have chosen more education (extended secondary schools) before working. We have good evidence for saying that they--to a large extent--have been forced out," Stal maintains.

What has happened to the young people who remain in the open labor market? Stal and Bursell have made the first Swedish investigation so far to find out where they end up now--compared with earlier.

They have made a detailed survey of Orebro community which includes about 50,000 employees and have also taken a look at the national figures. The picture emerging from the Orebro study and that of the nation as a whole are similar.

When Stal and Bursell were looking for possible changes and shifting features they divided the labor market into different sectors--in accordance with international models.

Sectors

The primary sector includes the "best jobs" which require a solid education and provide security and a good salary.

The secondary sector includes jobs primarily found in the production of goods and services, with lower educational requirements and less advantageous conditions.

The marginal sector covers those jobs where no educational training is required and where the pay and security are worst.

"Despite the fact that the educational level has been raised an increasing number of young people tend to end up in this marginal sector." says Stal.

His extensive research also shows that a worsening labor market increases sex discrimination too. The groups moving into the marginal jobs--in both age groups, 16-19 and 20-24--are mostly made up of girls.

Services

Boys seem to have a more secure place in the primary sector. There is a definite trend that shows a number of young people moving from jobs in the production of goods to the production of services during this period.

The pattern in the Orebro-study agrees with the results obtained by the Center of Statistics (SCB) in their analysis this year. The SCB has made a comparative study of youth employment (16-24-years old) in different occupations in 1980 and ten years ago.

The most common job emerging for girls has been that of a practical nurse. There has been an increase of 18,000 since 1970. Other jobs showing large increases are cleaning-women (an increase of 8,000), kitchen aids (an increase of 5,000) and home aids (an increase of 4,000).

There has been a decline for girls in the office professions (minus 23,000) and 5,000 less work in stores. Boys likewise show the greatest increase in the practical nursing field (3,000 more).

Explosion

Rolf Stal feels that the new youth law was an entirely necessary reform in view of the results produced by the 20-year-study and the explosive increase of youth unemployment since 1980.

It provides four hours of daily employment for almost 40,000 young people 18-19 years of age. The youth law also provides four hours of training each day in some communities--including Orebro.

"If large groups of young people are ever to have a chance to get jobs in the future labor market it is necessary to explore all possibilities for creating new jobs. I believe that we must "make work" out of tasks in society that we are presently not paying for. We ought to be able to do that if we start thinking in a new way and focus on the interest and involvement young people have in different areas," says Rolf Stal.

Where are young people needed today and in the future? What do they themselves have to say about the heavy jobs where their numbers have increased? DAGENS NYHETER will report about the youth in a changing labor market in a series of forthcoming articles.

9349
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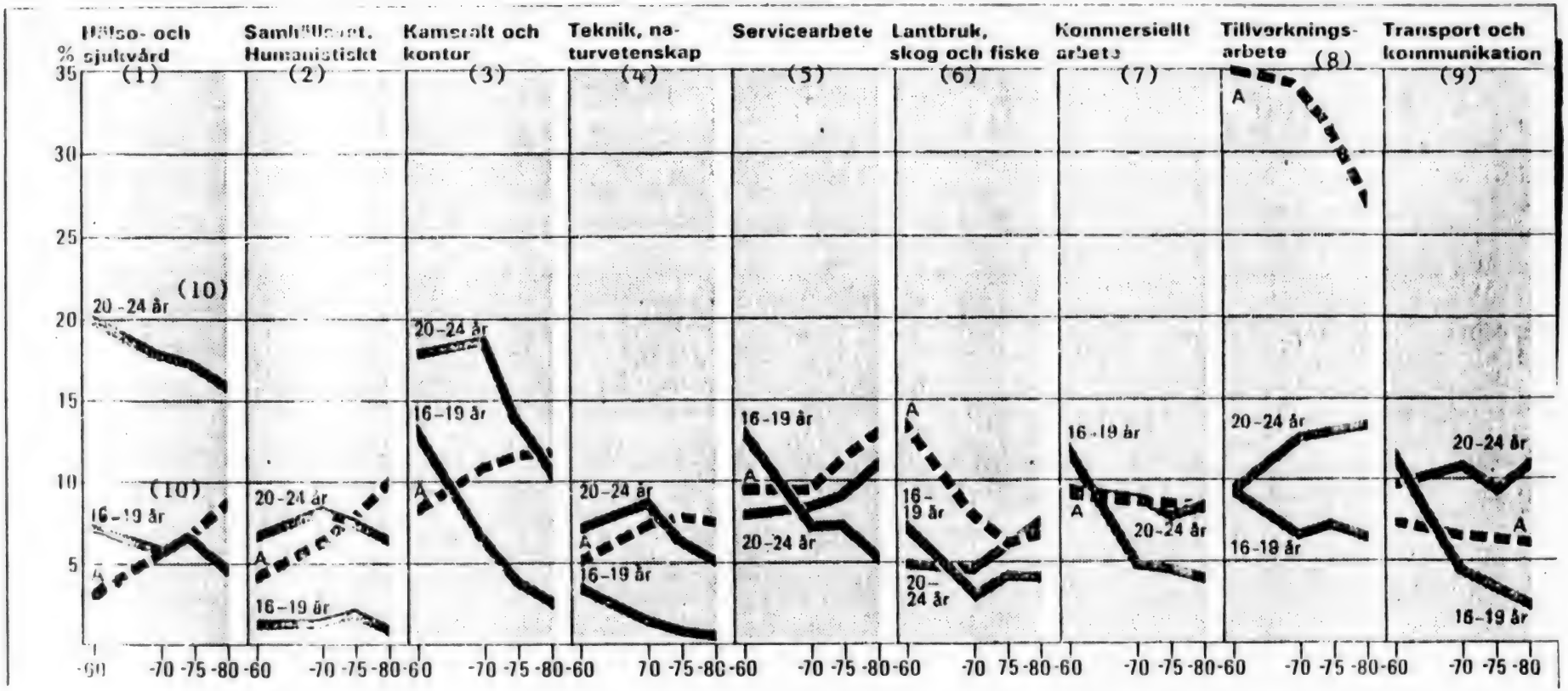

The diagram shows changes in nine parts of the labor market between 1960-1980. A-curve shows the share in relation to the total labor market. The others show youth groups in relation to the part-time labor market. A = The share of the professional group in relation to the total labor market.

Key:

1. Public health and sick care
2. Social science/liberal education
3. Accounting/office
4. Technology/natural sciences
5. Service jobs
6. Agricultural/forestry/fishing
7. Commercial jobs
8. Production jobs
9. Transportation/communications
10. Years of age

GASUNIE LOSING GROUND IN EUROPEAN NATURAL GAS MARKET

Rotterdam NRC HANDELSBLAD in Dutch 7 Nov 84 p 11

/Text/ Amsterdam--The Dutch firm Gasunie expects its portion of the West European natural gas market to drop to roughly 20 percent by 1990. At the moment, Gasunie still has a 27 percent market share, and it was still 41 percent in 1979. These figures were furnished yesterday by the CEO of Gasunie, A. H. Grotens, on the occasion of the international gas exposition Gastech that is being held this week in the Amsterdam Rai.

Gasunie is presently conducting negotiations with foreign buyers (Belgium, Germany, France and Italy) concerning a possible extension of the current export contracts. The goal of these discussions is to arrive at an extension of deliveries, now due to expire in the nineties, for another 10 years. In this way, GAsunie hopes to maintain the level of Dutch gas exports at a "reasonable" level at least for a number of years after the year 2000.

Offering an extra amount of gas for export (100 to 150 billion cubic meters are being considered--editor) has become possible because of a drastic change in the Dutch energy policy, which--until recently--was directed towards saving as much as possible of the Groningen gas for later.

Not only are they offering existing buyers additional gas, but they are also negotiating with a potential new client, Great Britain. The British see the Dutch gas as an alternative to the relatively expensive gas from Norway. And a pipeline that is to be built between the Netherlands and England would make it possible, moreover, for England to start purchasing Russian gas via Gasunie's transport network.

Gasunie director Grotens indicated yesterday that, in course of negotiating with the foreign clients, they are trying to get some compensation for the high degree of flexibility in deliveries that is typical of Dutch natural gas. In addition, they are trying for a new price formula that would couple the price of gas not only to that of fuel oil but also to the price of (more expensive) domestic fuel oil. According to Doctorandus Grotens' projections, it is above all the Soviet Union (29 percent of the West European gas market in 1990 versus 17 percent now) and Algeria as well that are emerging as important gas suppliers for West Europe. The Algerian share will equal that of the Netherlands (20 percent) in 1990.

Aside from the Netherlands, Norway is also currently losing ground in the European gas market, especially to the Soviet Union. According to professor O. Noreng, director of the Norwegian Institute for Energy Policy, both Norway and Algeria, by remaining more or less on the sidelines and not offering any large new quantities of gas at competitive prices, are in danger of losing their influence on the West European market. This could even ultimately lead to these two countries becoming, to an increasing degree, "marginal gas suppliers." The Netherlands' return to the gas export market is of great importance, according to Professor Noreng, given that there are so few offerings being made.

The Norwegian argued for a more active and aggressive role for Norway and Algeria in the European gas export market with respect to the Soviet Union. The potential danger of a price war was acknowledged by Noreng but, in his opinion, the risk is being avoided since the Norwegians and Algerians are presently assuming a wholly secondary position.

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STATOIL CITES ADVANTAGES IN BEING ALLOWED STATFJORD CONTROL

Oslo AFTENPOSTEN in Norwegian 9 Nov 84 p 32

[Article by Morten Woldsdal: "Statoil Wants Control of All Production"]

> [Text] "In view of the international oil market situation, Statoil would be better able to control the Statfjord production if it could take over the operation of the field," according to Statfjord information chief Willy H. Olsen. By having full control of the production, the company feels it would have a better chance of preventing cuts in Norwegian oil prices when the market is depressed.

The company thus brings a new argument into the public debate as to who should operate Statfjord in the future--Mobil or Statoil. However, Olsen said that Statoil has presented this argument before to the authorities.

He told AFTENPOSTEN that production at Statfjord could be stopped in connection with maintenance, for example, in order to adjust the output to the market situation.

"I am not saying that we--as operators--would necessarily alter the maintenance schedule to halt production. However, we would have the option to do this based on market conditions," said Olsen. He added that this year's maintenance stoppage at Statfjord came somewhat earlier than expected. This created some problems with respect to oil sales.

Olsen pointed out that it is difficult to regulate oil production on the Norwegian continental shelf today. "Foreign oil companies produce oil for their own systems. They have no need to sell their oil on the international market and, therefore, do not have to adjust their production according to the markets," he said.

The information chief pointed out that Statfjord crude oil is the most important source of revenue for the company in the future. During the 1980's crude oil will represent 85 percent ot Statoil's total oil production.

"In order to get the best possible market price--and thus maximize income--it is very important that Statoil control this important source of revenue," he said.

Statoil feels that control is particularly important as far as Statfjord is concerned. All the oil produced in this field is buoy-loaded into big tankers. This means that the company has very little choice as to loading times and volume, according to Olsen.

He stressed that most of Statoil's crude oil production is sold on long-term contracts. The company plans its sales based on Mobil's projections concerning oil production at Statfjord.

Records Create Problems

"So far, production at Statfjord has greatly exceeded Mobil's projections. When there is an excess of crude oil on the market, it means we must sell even greater amounts of oil on a weak spot market. This creates problems with respect to individual customers, but it also creates problems with respect to the market--Statoil is forced to lower its crude oil prices and this, in turn, lowers standard market prices as well," said Willy Olsen.

He pointed out that it might be all right to have maximum production at Statfjord in the future similar to today's record output.

"If we had control of the operation, however, we could better plan the production. This would also give us better control over oil shipments from Statfjord. Big market surprises would be avoided and we would be better able to meet scheduled delivery dates. If we do not meet these dates it could affect prices," said Willy H. Olsen with Statoil.

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MINISTRY OFFICIAL ATTACKS STATOIL PRICE CUT DECISION

Oslo AFTENPOSTEN in Norwegian 9 Nov 84 p 32

[Article by Flemming Dahl: "Statoil Severely Criticized"]

[Text] In an address delivered yesterday, Oil and Energy Ministry Undersecretary Arild Rodland severely criticized Statoil for its recent cut in the price of crude oil.

"What happened was completely unacceptable," said Rodland about the method used in cutting the price, which shocked the international oil market.

He contended that Statoil was guilty of lack of judgment with respect to the international reactions that followed and with respect to its responsibility to inform the Government.

"We are now trying to determine the actual course of events," said Rodland, who stressed that Statoil can expect a reaction from the Oil and Energy Ministry when the course of events has been established.

Rodland's harsh words fell during a meeting at the Economic Market Debate Center.

Concerning the question as to whether Statoil would be allowed to use its option to assume control of operations at the North Sea Statfjord field now in the hands of Mobil, Rodland said that the Oil and Energy Ministry's near-term decision would, among other things, be based on two important premises: the ministry feels that Statoil is qualified to handle the task and, moreover, it wants to give continued priority to tying the Norwegian continental shelf activity to the international oil market.

Rodland did not want to predict which of these premises would carry the greater weight or if they might be combined when the ministry makes its decision.

8952
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RESEARCHERS FROM NORDIC COUNTRIES DISCUSS POLAR ACTIVITIES

Oslo AFTENPOSTEN in Norwegian 16 Nov 84 p 52

[Article by Torill Nordeng: "Researchers Want To Cooperate"]

[Text] Nordic polar researchers want more joint research projects and better utilization of each others' expertise. During an Arctic research conference in Drammen, Norway, Swedish, Danish and Norwegian researchers agreed to work together on Svalbard. They will drill and remove ice cores to analyze their "annual rings." The movement of the ocean currents between Svalbard and Greenland will constitute another Nordic research project.

Some 60 to 70 Nordic researchers attended the polar conference which ended last Wednesday in Drammen. The conference was arranged by the Norwegian General Scientific Research Council (NAVF) and financed by the Nordic Scientific Research Committee.

Birgit Andersen, top NAVF adviser, said the researchers were very much interested in being able to utilize each others' expertise in a responsible and rational manner. As an example, she mentioned the reciprocal use of laboratory equipment. This means that Swedish researchers do not have to purchase costly and advanced equipment already available in another Nordic country.

"Also, in connection with big international research projects, Nordic researchers can make an even greater contribution by banding together as a Nordic unit," she said.

Andersen believes there will be another polar research conference in about a year.

Professor Anders Johnsson, chairman of the National Scientific Research Council's Polar Committee, pointed out that all in attendance at the conference were very positively disposed toward cooperation.

Expanded cooperation relative to oceanographical research in the waters west of Svalbard is particularly important, according to Johnsson.

"By learning more about oceanic behavior and climatic changes, one can calculate what would happen if we started to drill for oil in the polar regions.

"While Norwegians have a great deal of expertise in oceanographical research, Swedes have gained much experience tracing chemicals in the water. This tells us much about the effects of pollution and, above all, where the water flows," he said. Greater cooperation is sought in this area as well.

"Nordic researchers also seek cooperation in the area of satellite data interpretation, but the time has not yet come to launch a joint Nordic weather satellite," said Johnsson.

8952
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SCHOLARS DISCUSS LATEST RESEARCH ON ACID RAIN EFFECTS

Pollution Origins Detailed

Helsinki UUSI SUOMI in Finnish 22 Oct 84 p 7

[Article: "Effects of Acid Rain Already Evident in Finland: 'Urgent Need for Countermeasures'"]

> [Text] The effects of acid rain are already evident in both the lakes and forests of Finland. According to researchers, there is an urgent need for action, since the forests in Finland--due to the soil and climate--are considerably more susceptible to pollutants than in Central Europe.
>
> "Maybe West Germany can endure the economic catastrophe caused by acid rain, but Finland can't afford it," says biologist Rauno Tenovuo, a professor at Turku University.

According to Tenovuo, Finland has about 10 years to act if it wants to be spared the same kind of destruction one sees in Central Europe.

"The assumption is, however, that we start immediately to decrease sulfur emissions."

Tenuvuo points out that the damage caused by acidic fallout accumulates rapidly once it has begun. In West Germany, for instance, it was estimated just a few years ago that 8 percent of the total forest acreage was harmed by acid rain. The government of the federal republic estimates in its recent report that destruction has increased to 50 percent.

Premonitory Signs Perceptible

Signs of the effects of acidic fallout have already been perceptible for some time in both the forests and lakes of Finland. Tenovuo attributes the death of many fish in southern Finland to acidic fallout.

"Sediment analysis has revealed the diatom algae to have acidity caused by fallout. In Sweden this development began in the 1960s, and now the forests are dying there in many places," says Tenovuo.

"One species of beard moss has already vanished from Finland's forests for the same reason. Certain species of lichen are likewise disappearing from the trunks of trees."

The shortening of the life of pine needles is also a warning sign, according to Tenovuo, as is the disintegrationof their wax coating. In several places, the pine trees no longer have primary or terminal shoots, and the tips of needles have turned brown.

"These are still premonitory signs, but you have to learn how to read them. Maybe West Germany can endure the economic catastrophe caused by acid rain, but Fonland can't afford it."

Energy Production Pollutes

Sixty percent of Finland's sulfur emissions currently derive from energy production. The burning of leftover lye in the cellulose industry causes roughly 15 percent of the emissions, and the remaining 25 percent comes from other processing, metal and chemical industries.

The situation is similar in other industrialized countries. According to EEC reports, 56 percent of the acid rain in the countries of the European community springs from emissions of heat-generating plants, 28 percent comes from other large-scale industry, 13 pe cent from small factories and 3 percent from cars.

International Problem

Solving the problems caused by acid rain requires international cooperation, because the fallout spreads over a radius of hundreds of kilometers from the point of origin. It is estimated that approximately two thirds of the fallout in Finland comes from abroad.

The origin of fallout is determined with the ehlp of different models. According to Ministry of Environment bureau chief Alec Estlander, the greatest sulfur fallout comes to Finland from the Soviet Union, Sweden, England, East and West Germany, Poland and Czechoslovakia.

"There are large regional differences here, however. Over half the sulfur fallout in southern and southwestern Finland is of domestic origin, while in the northern parts of Lapland only about 10 percent originates in Finland."

Estlander points out that Finland correspondingly pollutes foreign countries. Roughly two thirds of the emissions are conveyed across the borders, and our sulfur exchange with the Soviet Union, for example, is about even.

Thirty Percent Reduction Not Enough

An international agreement on preventing sulfur fallout has been reached. The 18 signatory states have pledged to reduce their sulfur emissions by 30 percent over the next 10 years.

Researchers consider this amount insufficient, however, and few states have suggested reducing emissions by 50 to 60 percent. Finland's share of Europe's sulfur dioxide emissions is just 1 percent, but our share of our own country's sulfur fallout is far and away the greatest.

Origin of Finland's Annual Sulfur Fallout

Finland	90,000 tons
East Europe	55,000 tons
Soviet Union	50,000 tons
West Europe	40,000 tons
Scandinavia	25,000 tons
	260,000 tons

Half Originates Domestically

Helsinki HELSINGIN SANOMAT in Finnish 29 Oct 84 p 2

[Article by Goran Nordlund, doctor of philosophy, special researcher at the Institute of Meteorology, specializing in the long-range transport of impurities and radioactive substances in the atmosphere: "Under Half of Finland's Sulfur Is of Domestic Origin"]

[Text] There has been a lot of talk recently about sulfur fallout. Although the basic causes and efforts are not clear to the general public, most people have probably formed a picture of the chain of events which begins with sulfur emissions from industry and energy production and ends with the damage done by acidic fallout to forests and lakes.

A large part of the fallout that affects Finland is of foreign origin. An important question has been raised in the discussion of measures for reducing fallout: how significant is the share of foreign emissions? Measures to limit sulfur emissions must be in correct proportion to the costs and benefits resulting from them. If the foreign share of sulfur fallout is decisive, then the benefits brought about by domestic reduction measures is undeniably small.

If, on the other hand, domestic emissions are the most important, the emphasis falls specifically on national restructions. This has been recognized both by industry, which first and foremost incurs the expenses of restrictive measures, and by special interest and civic groups, which fight for a cleaner environment. Research results are for this reason interpreted in different ways to support one's own objectives.

Most Is Sulfur

Most of the acidic fallout in Finland is sulfur. Nitrogen fallout is not quite one third of the fallout sum. Information about sulfur fallout in Finland is based for the time being on measurements obtained from several observation points and the results of two comprehensive international projects. One of these is the 1972-1975 OECD-coordinated project Long-Range Transport of Air Pollutants (LRTAP), and the other is the ECE-financed Cooperative Program for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP).

In addition to these two comprehensive international projects, supplementary information can be obtained from national research studies done in various European countries. The computations of air pollutant transport in both the OECD/LRTAP and the ECE/EMEP projects were made primarily by a research group which has worked in association with Norway's institute of meteorology. Although the computations of long-range transport of sulfur pollutants were actually made in Norway, the outcome of studies done elsewhere does not contradict the Norwegians' results.

Results of the OECD/LRTAP project reveal to what degree each country inflicts sulfur fallout on other countries and, correspondingly, in which country the sulfur falling on a certain country originates.

According to this project, the total sulfur fallout in Finland in 1974 was 400,000 tons, of which 100,000 tons was Finland's own share. However, a significant share of the fallout in Finland, 70,000 tons, was such that its origin could not be determined.

All the numerical values I present in this article are obtained by a mathematical/physical computational method; sulfur transport and fallout are determined by using wind and other meteorological data.

Estimates made of Finland's sulfur fallout for 1975 and 1976 deviated somewhat from the 1974 figures; in other words, the total fallout came to 100,000 tons less than the 1974 figure. The uncertain share was also smaller.

Converted into percentages, the above-mentioned fallout figures give a domestic share of 25 percent for 1974 and 33 percent for 1975 and 1976. It must be taken into account, however, that the uncertain share was 16 to 20 percent in different years, and part of it may be domestic.

Tampere's "Square"

Fallout distribution is computed country by country in both the ECE/EMEP and the OECD/LRTAP projects. The fallout values produced by the ECE/EMEP project are presented on the accompanying map as average values per square (in a unit: milligrams of sulfur per square meter a year). The

size of a square is 150 kilometers by 150 kilometers. The illustration--published here with permission of the makers--is obviously the most precise representation so far of Finland's sulfur fallout.

The domestic and foreign shares can be computed as percentages from the numbers on the map. The domestic percentage share is highest in the square which for the most part covers the area between Tampere, Jyvaskyla and Lahti. The domestic share in this square is either 46 or 52 percent, depending on whether the uncertain share is entirely of foreign origin or is distributed between both groups. Those who made the computations themselves think that the uncertain share comes chiefly from abroad.

Analogous percentage figures from other areas reveal that the domestic share of sulfur fallout is about 30 percent on the southern and western coasts, roughly 25 percent in central and southeastern Finland, and generally 20 percent in northern Finland. An exception is the Oulu and Raahe coastal area, where nearly 50 percent of the sulfur fallout originates domestically, according to computations.

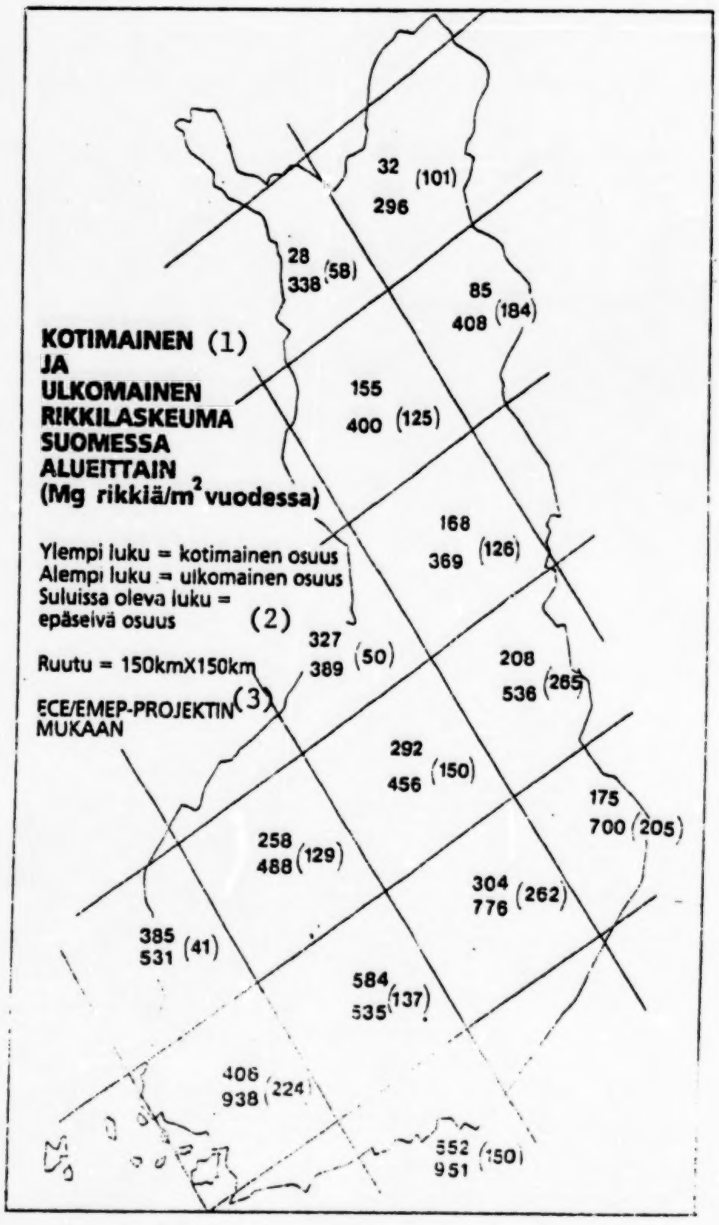
Uncertainty Factors

The fallout measurements made in Finland support the computational results with respect to quantities of total fallout. Strictly speaking, we are unable to determine by measurements the total sulfur fallout, i.e., for the time being it is technically impossible to delineate the absorption processes of plants and soil, processes which, for example, are quite significant with regard to sulfur fallout.

Because we cannot tell from fallout measurements where the sulfur fallout originates, we have not been able to prove the correctness of computational results concerning the proportion of domestic and foreign shares. The high values of sulfur content and fallout in densely populated areas, however, show how significant the effect of nearby sources is. For example, sulfur fallout in Tampere is found to be over twice what it is in southern Finland's provincial regions.

The fallout values presented on the map are based on computational results obtained from 1979 to 1980. Those who made the computations have estimated that those years were climatically typical with regard to long-range transport of sulfur. So we should not expect the results to differ very much from those already presented even if the computations are projected over a longer period.

In support of these computations, we can also mention that corresponding figures arrived at elsewhere, mainly in the Soviet Union, give the same type of results.



Key: (1) Domestic and foreign sulfur fallout in Finland by regions (Milligrams of sulfur per square meter a year)

(2) Upper figure = domestic share
Lower figure = foreign share
Figure inparentheses = uncertain share

(3) Square = 150 km by 150 km
According to ECE/EMEP project

However, uncertainty factors also enter into the figures presented here for amounts of sulfur fallout in Finland and into the foreign and domestic shares of those amounts. They derive principally from the fact that we still know fairly little about the speed at which sulfur falls. This particularly concerns fallout which comes down with rain.

By changing the values for the speed at which sulfur falls in the computational method, the proportion of foreign and domestic shares comes out different from what is presented above. It is even thought on the basis of recent studies that the domestic share of Finland's sulfur fallout is slightly smaller than suggested in the foregoing.

Shares Fluctuate

What would the fallout patterns look like if they were presented with regional accuracy greater than the average values for squares 150 kilometers by 150 kilometers? The question can be answered in a preliminary way on the basis of studies done in Finland. There has been research for some time now at the Institute of Meteorology to separate the shares of Finland's sulfur fallout.

It can be stated on the basis of results obtained so far that the domestic share of fallout fluctuates clearly and substantially from one place to the next. This is no surprise. It is evident that in the vicinity of large industrial and energy-producing plants which emit sulfur the domestic share of sulfur fallout is considerably greater than the regional average value indicates. Correspondingly, the greater the distance from domestic source areas, the more dominant the foreign share becomes.

Bearing in mind the percentage figures presented earlier, we can state concisely that except for areas adjacent to large industrial and power plants scarcely half--at most--of the sulfur fallout in Finland is of domestic origin. The domestic share is generally smaller, but it is still a significant addition.

The distribution of fallout into domestic and foreign shares has received a central place in the discussion of Finland's so-called sulfur policy. It would be wrong to neglect our own measures to restrict sulfur emissions, even though the share of domestic emissions is not decisive with respect to the amount of sulfur fallout in Finland.

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BRIEFS

PROGRESS IN PCB ELIMINATION--The elimination from use of PCB preparations has progressed even faster than the PCB committee suggested, reported Ministry of Environment department head Olli Ojala at a worker health conference in Tampere on Wednesday. The manufacture of chlorophenols has ceased in Finland, so that chlorophenol emissions from sawmills may end next year, assumed Ojala. [Text] [Helsinki UUSI SUOMI in Finnish 25 Oct 84 p 6] 12327

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